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# **Re-thinking the received wisdom on education: alternative policy lessons**

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## Main points of the brief

- The received wisdom on education holds that, given that increasing education levels correlates positively with economic growth, jobs, and development at large, investments should be made in order to move people into higher levels of education.
- However, this wisdom can be countered on at least three grounds:
  - (i) Across countries, skill levels differ enormously among people with the same level of education.
  - (ii) Job prospects among highly educated people differ vastly from one country to another.
  - (iii) Although the relation between investments in education and higher education attainment levels is clear, the relation between investments in education and higher skill levels is far more ambiguous
- The qualifying remarks seriously put into question the policy messages derived from the received wisdom on education. Instead, they call for a set of alternative policy lessons:
  - (i) Apart from increasing education attainment across all countries, policy makers should increase the skills of those with the same education background.
  - (ii) Instead of education levels, policymakers should start increasing skills early on whereas improving skills early on improves employment status later on in life.
  - (iii) Underperformance in skills is not just due to a lack of investments in education. Rather, some education systems exhibit systemic features that need to be addressed first if their performance is to improve.
- Above all, this brief makes clear that policy makers in the field of education should not focus their policies on a limited set of “easy catch” indicators only. Instead, policymakers should take into account and weigh a range of different indicators if one is to make a proper judgment about where education is heading to and how to improve it.

## 1. Introduction

Education is widely considered to be of key importance to economic performance. Whether one looks at education as a defining aspect of human capital and therewith a pivotal factor in economic production (Barro, 2001) and social well-being (Desjardins, 2008), or, as a fundamental goal in itself in terms of the emancipation and betterment of mankind (Sen, 1999); no definition of progress can or should reasonably be separated from a call for better education. Whilst the former view focusses on the relation between education and economic growth in a narrow sense, the latter view focusses on the relation between education and development more broadly. We do not contest the emphasis put on education in either view.

However, beyond stressing its mere importance, we believe there is much more to say about education in relation to growth, jobs, and development. The current view on education, one we call the received wisdom, primarily stresses the importance of attaining higher levels

**In a nutshell, the received wisdom on education holds that increasing education levels is good for economic growth, jobs, and development at large. The more we invest in moving people into higher levels of education, the better off people will be.**

of education as a panacea to solving both economic and social problems. In light of this received wisdom it should come as no surprise that a prime target of the European Commission's Horizon 2020 strategy is to increase the share of people having attained higher education up to 40% or higher. In terms of education policy, then, more investments should be made as to move people from lower to higher levels of education.

At least two issues can be raised with respect to this received wisdom. One is that education is not a univariate phenomenon. What goes into and comes out of the education process is by no means the same across different countries. In other words, whilst on average it might be true that increasing levels of education may increase economic performance; huge differences exist herein among different countries. Second, though to a certain degree part of the first issue, focusing on education attainment levels alone says little to nothing about the knowledge and skills that people actually obtained throughout their education. Here, participating to education need not be the same as learning important knowledge and skills from education. With this short note we intend to address both issues.

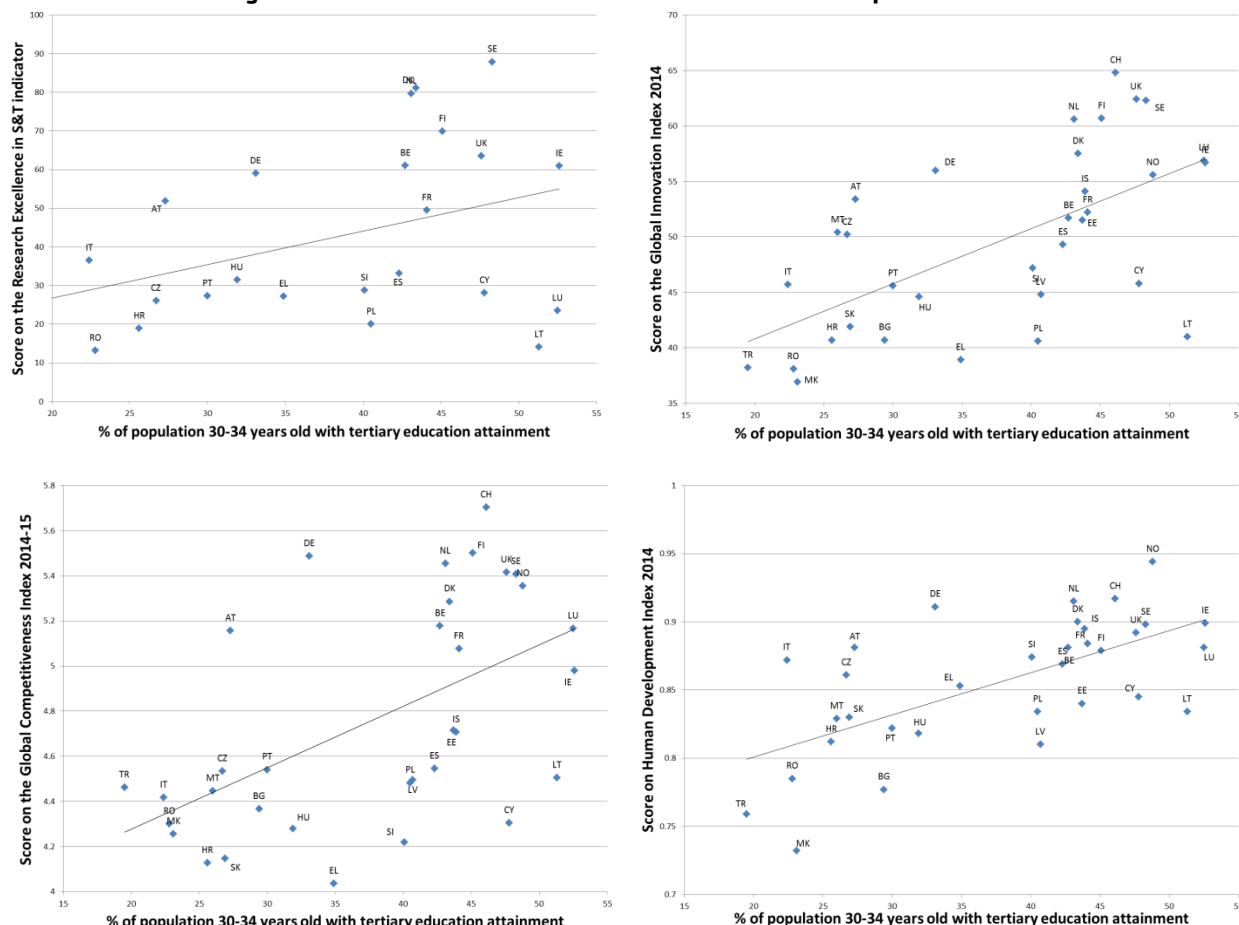
In what follows, we first take a look at some of the available data and restate the received wisdom on education. In other words, we replicate much of what can be taken as the standard perspective on the importance of education by leaving the way education performs across different countries virtually unaddressed. Overall, we formulate three main lessons that can be, and in fact are usually, derived from this received wisdom on education. Second, then, we revisit some of the standard assertions made from the received wisdom on education by taking a closer look at data on skills and inter-country differences in labor market prospects of highly educated people. Here, we present a set of three qualifying remarks that question the validity of the standard assertions made by the received wisdom on education. Finally, therefore, following up on the three qualifying remarks about the received wisdom on education, we restate the policy lessons that need to be drawn. Our main message is clear: higher education alone is not a deterministic factor driving economic performance per se. We need to take a closer look at what it is about education that generates appropriate skills for people in some countries but not in others. As it turns out, not just education itself but also the skills acquired through education drive economic performance. It follows that just focusing on more investments in education is not enough. On the contrary, it might only be a waste of money if *what* and *how* we teach our children does not change in line with future labor market demands.

## 2. Lessons from the received wisdom on education

### Lesson I: more education is good for economic performance

As the standard argument goes, education is good for economic performance. We do not need to spell out the theoretical arguments underlying the exact nature of this relationship here. Suffice it to show a number of simple scatter plots that illustrate the point.<sup>1</sup>

**Figure 1. Some relations between education and economic performance**

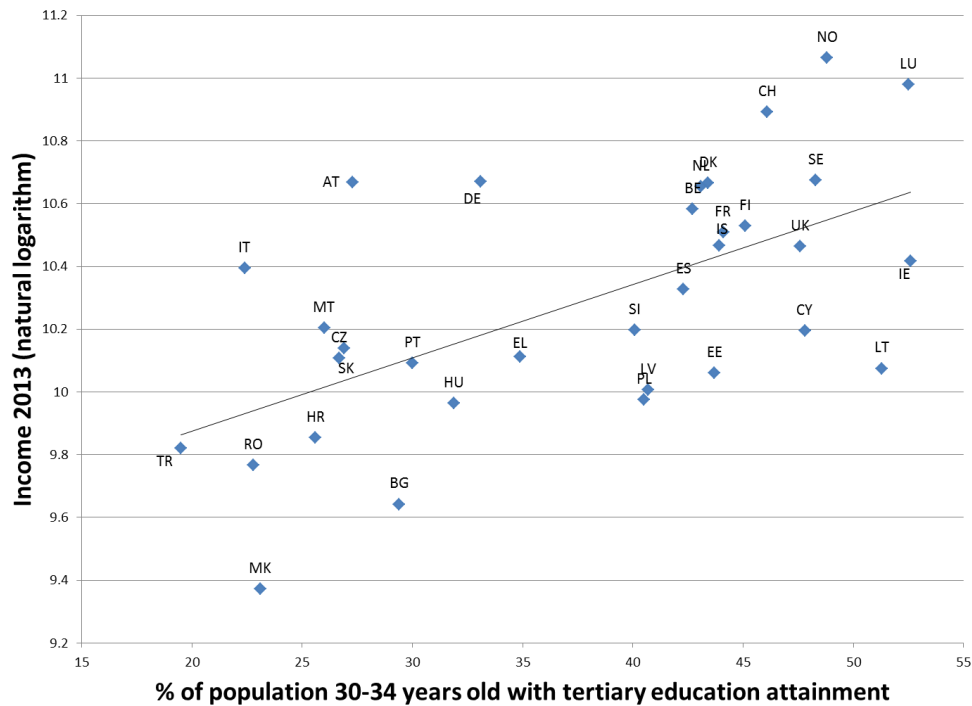


Sources: Eurostat (% of population 30-34 years old with tertiary education attainment); Hardeman et al., 2013 (Research Excellence in S&T); Cornell University et al., 2014 (Global Innovation Index); World Economic Forum, 2014 (Global Competitiveness Index); United Nations Development Program, 2014 (Human Development Index)

Clock-wise and in four different panels, Figure 1 shows the relationship between on the one hand tertiary education attainment among 30-34 year olds (one of the headline indicators underlying the European Commission's Horizon 2020 strategy) and on the other hand Research Excellence in Science & Technology (Hardeman et al., 2013), the Global Innovation Index (Cornell University et al., 2014), the Global Competitiveness Index (World Economic Forum, 2014), and the Human Development Index 2014 (UNDP, 2014). The message from all four panels is clear; whatever economic performance indicator we look at, education correlates positively and significantly with it with correlations ranging from 0.39 (Research Excellence in S&T) to 0.64 (Human Development Index).

<sup>1</sup> Descriptions, summary statistics, and correlations of all variables used in this brief are listed in the annex. All data are available upon request.

**Figure 2. Relation between education and income**



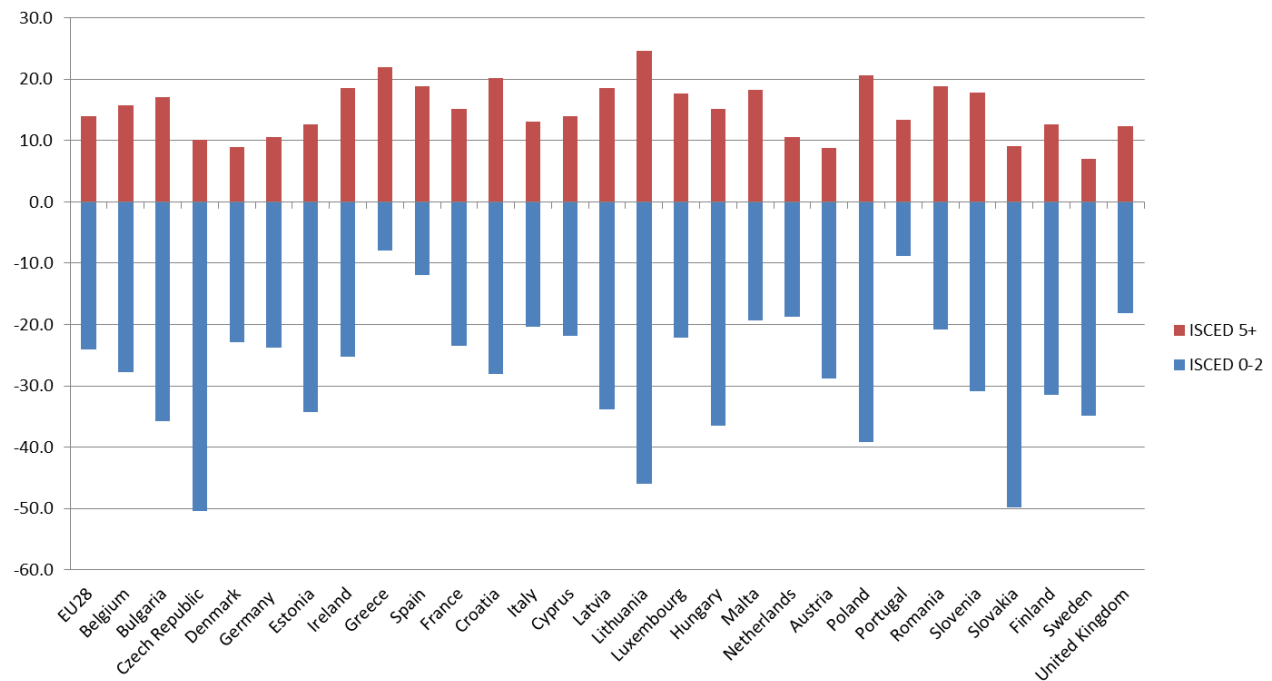
Sources: Eurostat (% of population 30-34 years old with tertiary education attainment); United Nations Development Program, 2014 (Income)

Of course one might argue that the ratio of high-to-low educated people correlates positively and significantly with these other metrics by definition. Especially for what concerns development, and to a lesser extent also competitiveness and innovation, this is no wonder whereas these concepts include education as part of their measurement. However, as illustrated by Figure 2, even if we take the education and health components out of our measurement of development, the relation between education and the more conservative measurement of development, i.e. income, still stands. In fact, correlations are about as large ( $r = 0.60$ ). Hence again, however we measure economic performance, education correlates positively and significantly with it.

## Lesson II: more education is good for jobs

Not only is education good for growth and development, so is education good for jobs. Following the European Commission (2014), Figure 3 shows exactly this by comparing the differential employment rates of people with high education levels with those of low education levels. For each and every individual country, high educated people are better off in terms of employment rates than low educated people; making a strong case for the importance of education in steering jobs.

**Figure 3. Employment rate differentials by education attainment level in 2013**

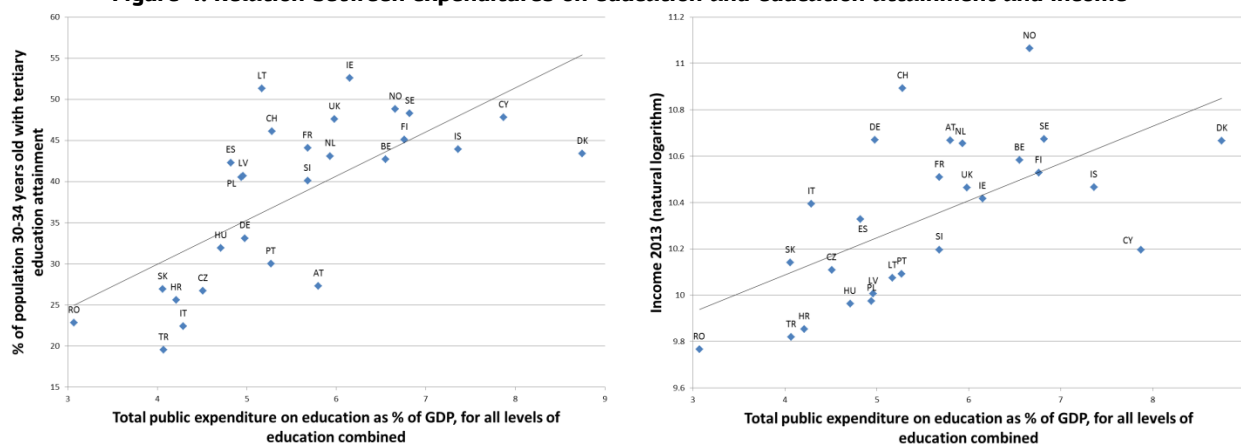


Source: Eurostat. Note: ISCED 0-2 indicates an education attainment level of at most lower secondary education; ISCED 5+ indicates an education attainment level of tertiary education and up or equivalent. Employment rates differentials are computed with reference to the employment rate of people with ISCED 3-4 (i.e. upper secondary education attainment or post-secondary but non-tertiary education attainment).

### Lesson III: invest more in education

If education boosts, growth, development and jobs, the message for policymakers seems utterly simple: increase investments in education. Indeed, as done in Figure 4, when we relate the investments in higher education to whatever measure of economic performance we again see that those that invest more in higher education are also those that perform best. Of course, few people would make causal inferences from these correlations. Nevertheless the image that arises seems to be staggering and, at least, appealing to many: investments in education pay off.

**Figure 4. Relation between expenditures on education and education attainment and income**



Source: own elaboration based on Eurostat (% of population 30-34 years old with tertiary education attainment; total public expenditure on education as a % of GDP for all levels of education combined); United Nations Development Program, 2014 (Income)

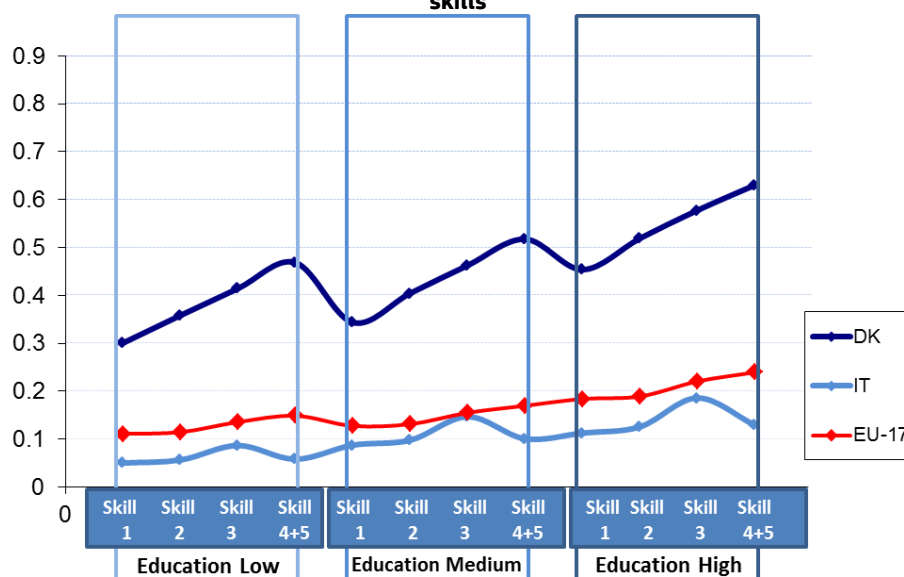


### 3. Re-visiting the received wisdom on education

#### Remark I: education attainment levels only tell us part of the story

Beyond education attainment levels, a recent study investigated the relationship between skill levels and social outcomes including interpersonal trust, volunteering, health and an individuals' sense of having influence on the political process (Costa et al., 2014). First, it turns out that, on average, skills are positively related to several aspects of social well-being on top of formal education levels. The results indicate that the educational system plays an important but not an essential role in steering social outcomes at large.

**Figure 5. Average predicted probabilities for level of trust accounting for educational attainment and numeracy skills<sup>2</sup>**



Source: Authors' calculation based on PIAAC, 2012. Note: Predicted probabilities are adjusted for socio-economic and demographic characteristics. Full information in other countries' outcomes is reported in Costa et al. (2014). Note: Average predicted probabilities showing the likelihood of adults reporting higher levels of trust, by level of education and level of skills in numeracy.

Second, though important on average, huge differences exist in the role played by skills in steering social outcomes across EU member states. Typically, skills contribute less to social outcomes in southern and eastern EU member states than they do in Northern and Western EU member states. Figure 5 above provides an example of this observation by comparing self-reported trust levels in Denmark and Italy for adults with different education and skill profiles. Up to 12 groups can be identified by combining three educational attainment levels with four levels of skills. First note that, independently of skill and level of education, the reported levels of trust by Danish citizens are higher than their Italian counterparts and well above the EU-17 average.

**The received wisdom on education does not take into account the important role played by skills in driving socio-economic outcomes**

<sup>2</sup> Unlike most of the other variables used in the analysis for this brief, the variables used to construct this figure are not presented in the annex. Nevertheless, these variables are of course again available upon request.

The most important finding emerging from the study is that, for Denmark, skills seem more important than education when it comes to trust. For Italy, the reverse holds true with educational attainment rather than literacy skills being more important for trust. In addition, not also that, for both Denmark and Italy, increases in skill performance outweigh increases in education attainment levels. Although this observation does not hold true for all countries, it is striking to see that increasing education attainment levels alone is not enough for generating desired social outcomes.

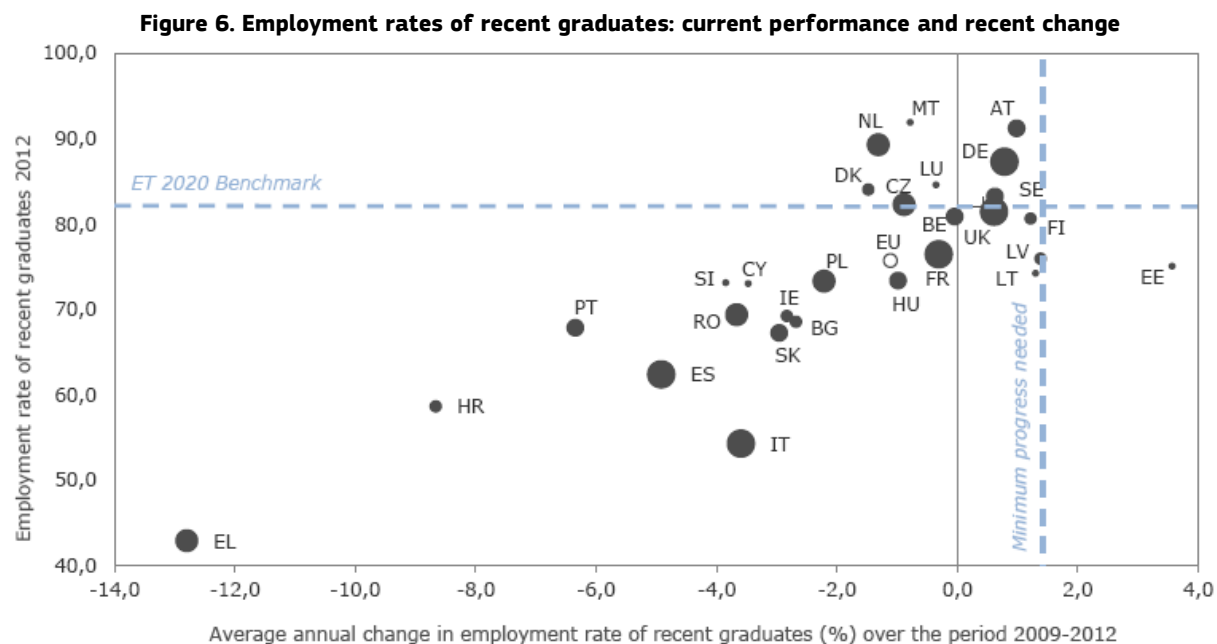
Overall, the results of the study suggest that improving skills bring considerable social returns and, in this respect, Southern and East EU member states have a longer way to go compared to their Northern and Western counterparts. In general and across all population groups, we see that both relations between skills and social outcomes and between educational attainment levels and social outcomes are positive, but their relative strength differs across countries, with typically skills typically being more important in the best performing economies.

## Remark II: education is by no means everywhere a secure ticket to jobs

Before we showed that employment rates of high educated people are far higher than those of less educated people (Figure 3, section 2.2). This seemed to suggest that improving education levels is good for employment. However, although this might be true on average, this observation in itself does not mean that high education offers some kind of guarantee for jobs in all EU member states.

The received wisdom on education does not take into account differences in job prospects of highly educated people across countries

On the contrary, as shown by Figure 6, for many Southern and Eastern EU member states, being a university graduate offers little opportunities on the labor market. Indeed, university graduates in these countries might still be better off than their less educated fellow countrymen and women but, despite the fact that they are highly educated; their prospects of finding a job now and in the future are nevertheless still extremely alarming.



Source: Garrouste, and Rodrigues (2012). Note: The size of the bullet-points shows the population size of the country.

### Remark III: investments do not unambiguously translate into high skill levels

If it is not education per se that triggers growth & development and if education does not offer an absolute guarantee for jobs, then perhaps also the univariate policy implication calling for more investments in education needs to be reconsidered. We believe there are indeed good reasons to reconsider this univariate call. First, as mentioned, it is hard to make causal inferences from the correlations between investments in education on the one hand and economic performance in general and educational attainment levels specifically on the other. For one thing, there might be confounding variables that correlates both with investments and performance that render these correlations spurious. This is particularly to be expected when using GDP as a denominator for investments in education as is done in Figure 4.

Second, measuring investments in education itself is not as straightforward as it may seem. Most in particular, linking investments to students at different levels of education is not straightforward as these data are not readily available. Third, although investments in education might be good for raising education attainment levels, this relationship says little to nothing about its relationship with skill performance. Given that skills are at least as important as education attainment levels, it is important not just to look at the relationship between investments in education and education attainment levels but also to investigate its relationship with skill performance.

Figure 7 presents two sets of associations illustrating the relationship between investments in education and their skill performance. While the graphs on the left hand side of Figure 7 show the relationship between student-teacher ratios and students' skill performance, the graphs on the right hand side of Figure 7 show the relationship between accumulated per pupil investments in education at ISCED level 1-4 and students' skill performance. Focusing on student-

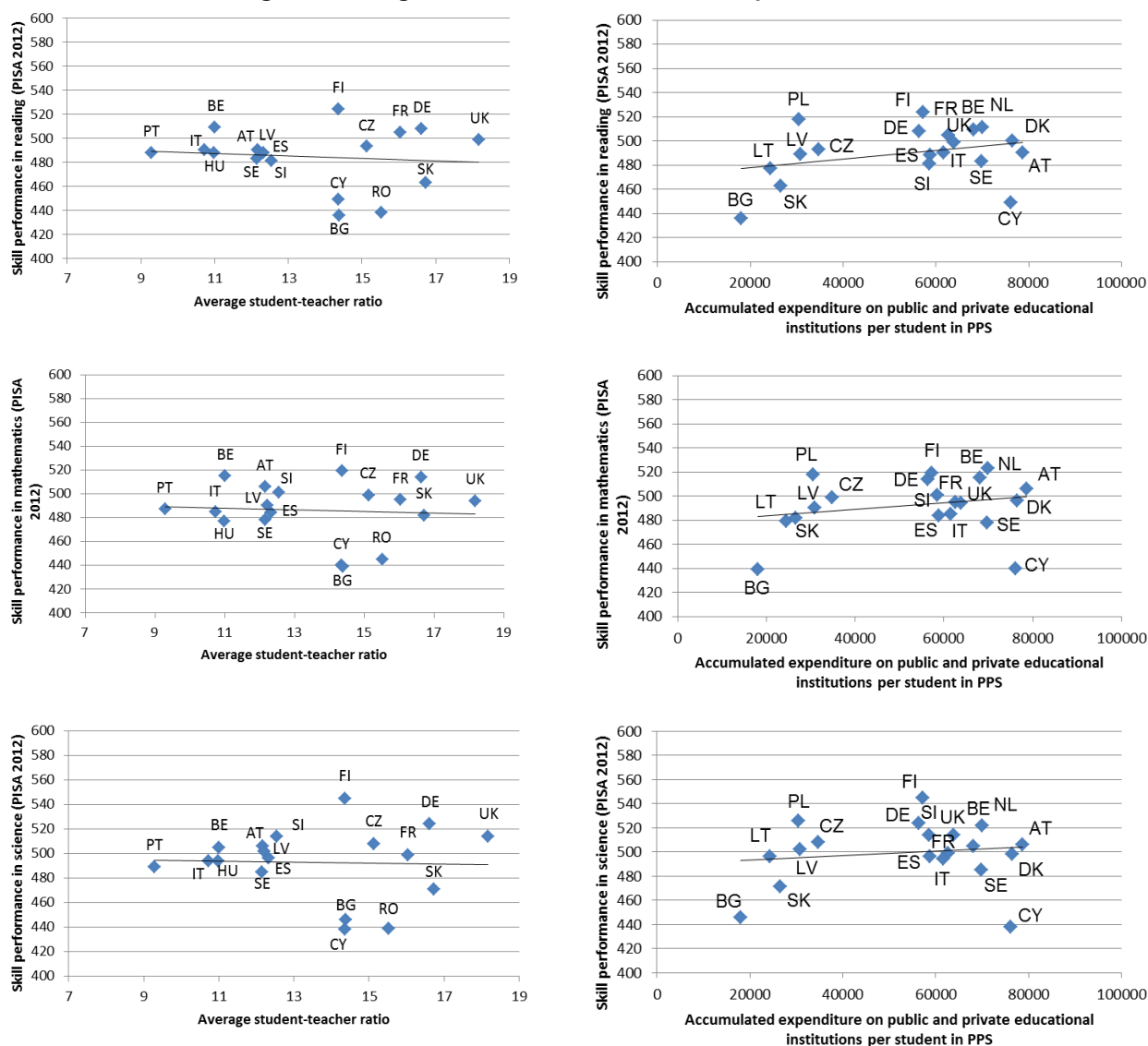
teacher ratios is justifiable on two grounds. One is that student-teacher ratios are said to indicate the amount of attention teachers can pay to their students; the higher the ratio, the less the attention. The other reason is that,

whereas human resources in education make up the larger part of expenditures in education, higher student-teacher ratios imply less investments made per student. An additional advantage of using student-teacher ratios is that these data are available for each ISCED level individually, allowing to calculate the amount of investments made in each student throughout its education life course up until being tested on their performance. Unfortunately these data are not readily available at such a fine-grained level for expenditures per pupil. Nevertheless we show a rough calculation for these data as well.

Overall, whether we measure investments by looking at student-teacher ratios or by looking at expenditures per pupil, it turns out that the relationship between investments in education and skill performance is far from clear cut. First, the relationships between student-teacher ratios and skill performance are neither significant nor positive; meaning that there exists no unambiguous relationship between the number of teachers per student and their skill performance. Second, although the relationships between investments per student and their skill performance are mostly positive, these are never significant. From these observations we could say that, it seems that investments in education do not necessarily translate into higher skills achievements of students; severely questioning once more the impetuous of just raising investments in education.

While the relation between education  
investments and education attainment levels is  
clear, the relation between education  
investments and skill performance is far less  
clear-cut

**Figure 7. Linking investments in education to skill performance**



Source: Own elaborations based on Eurostat data

## 4. Re-thinking the lessons from the received wisdom on education

### Alternative lesson I: when improving education levels, improve skills accordingly

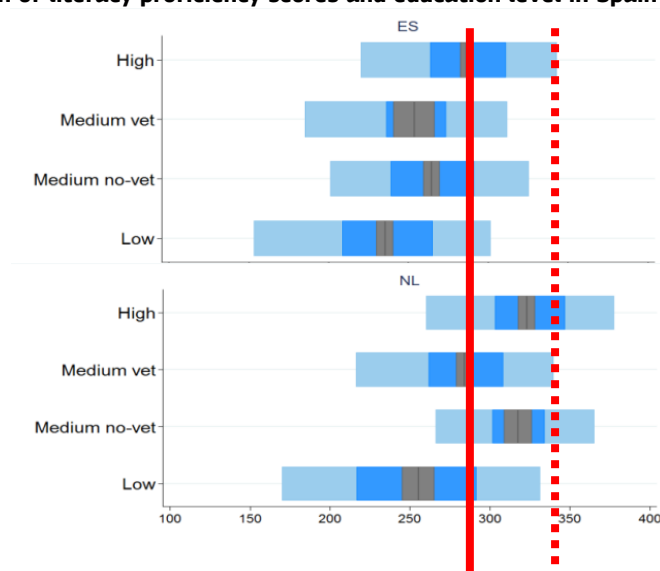
As mentioned, one of the EU targets within the Horizon 2020 strategy is to increase the percentage of 30-34 year old people having attained higher education to 40% or more. The question is, however, whether it is increasing skill levels or increasing formal education levels that would make people in (esp. underperforming) countries better off.

Focusing on increasing education attainment levels alone is not enough whereas skill levels among people with the same education background differ vastly across EU member states

Research undertaken from the recent release of the Survey of Adult Skills

(PIAAC, 2012) shows that, across and within countries, there is significant variation in the level of skills among young individuals despite similar formal qualifications (OECD, 2013).

**Figure 8. Distribution of literacy proficiency scores and education level in Spain and The Netherlands<sup>3</sup>**



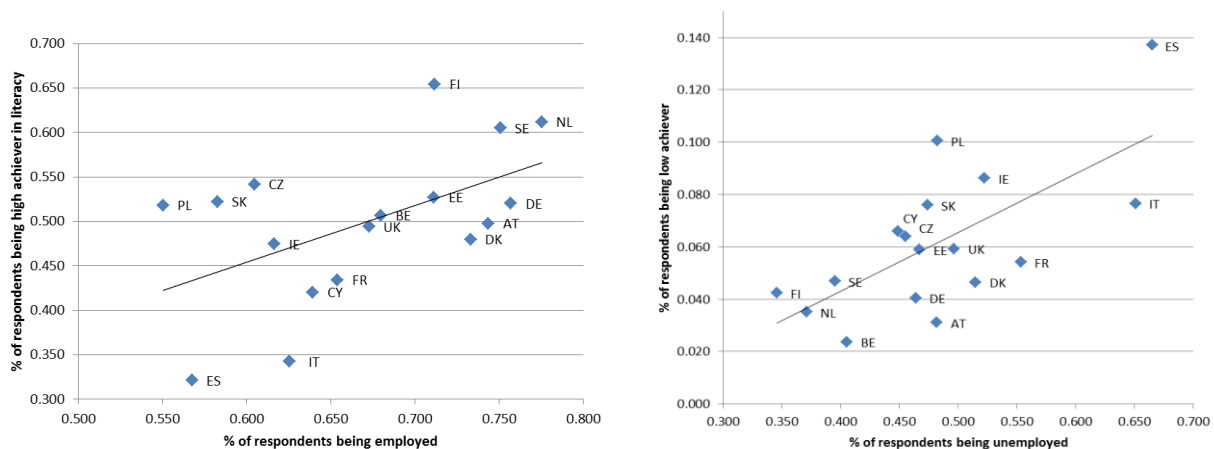
Source: PIAAC, 2012 (Survey of Adult Skills). Note: percentiles in literacy proficiency, by educational attainment. Mean and 0.95 confidence interval around the mean (grey bars). Percentiles: 25th and 75th (dark blue) and 5th and 95th (light blue).

To illustrate this point, Figure 8 compares the skill levels of Spanish graduates with those of their Dutch counterparts. These two countries share, on average, a similar proportion of young graduates with tertiary education attainment. However, Dutch graduates with only medium education outperform Spanish university graduates in terms of skills. Even more striking, the best university graduates in Spain (95th percentile) are not better than the best high school graduates in the Netherlands. It follows that, if Spain is to catch up with the Netherlands, focusing on increasing attainment levels in higher education alone will not do the job. Instead, one should focus on increasing the level of skills across all education levels.

<sup>3</sup> Unlike most of the other variables used in the analysis for this brief, the variables used to construct this figure are not presented in the annex. Nevertheless, these variables are of course again available upon request.

## Alternative lesson II: improve skills early on

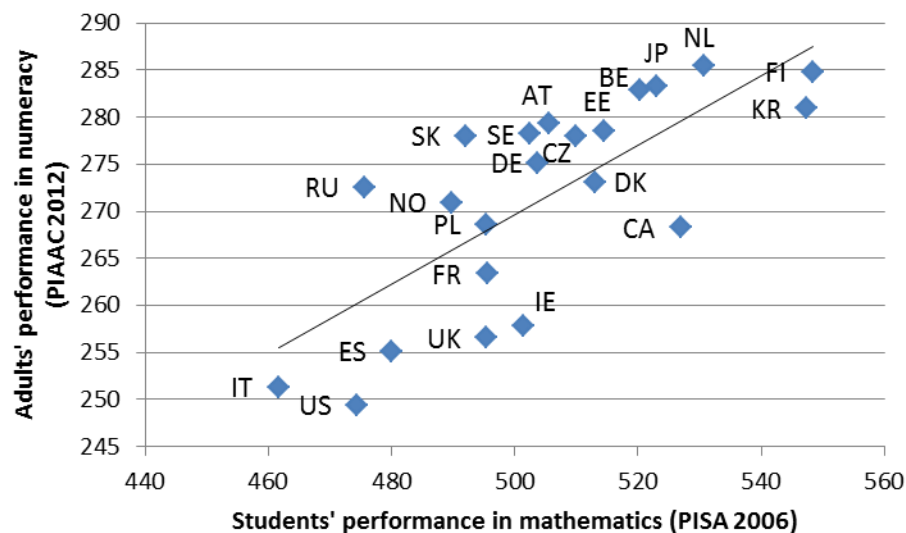
**Figure 9. The relation between skill performance and unemployment and employment**



Source: PIAAC, 2012 (Survey of Adult Skills).

Figure 9 plots average skill performance of the labor force across different countries with employment (left panel) and unemployment figures (right panel). As it turns out, those countries that on average report higher skill levels, also show lower unemployment and higher employment levels. Not only does this observation hold for all education attainment levels taken together but also when keeping education attainment levels fixed. In other words, skills are important beyond education levels attained alone.

**Figure 10. PISA mathematics performance (2006) versus PIAAC numeracy achievement (2012)**



Source: Own elaboration based on OECD data. Note: The correlation is ranging between 0.5-0.7 depending on the exact time lag considered (different PISA waves versus different PIAAC age groups).

A strategic focus means that skills should be increased with an eye on future labor demand. As shown by figure 10, on average, skill performance at an early age corresponds with skill performance at a later age. While claiming

Learning the right skills today improves employment status tomorrow

no causality and although the respondents of the two surveys are not the same, linking the former measure in 2006 with a latter measure in 2012 provides a rough indication of how performance at an early age serves as a pre-condition of performing at a later stage of one's life. Combine this observation with the ones made in figure 9 and the message should be clear: focus on increasing skills of the young today, as to reap the benefits in terms of job prospects tomorrow.

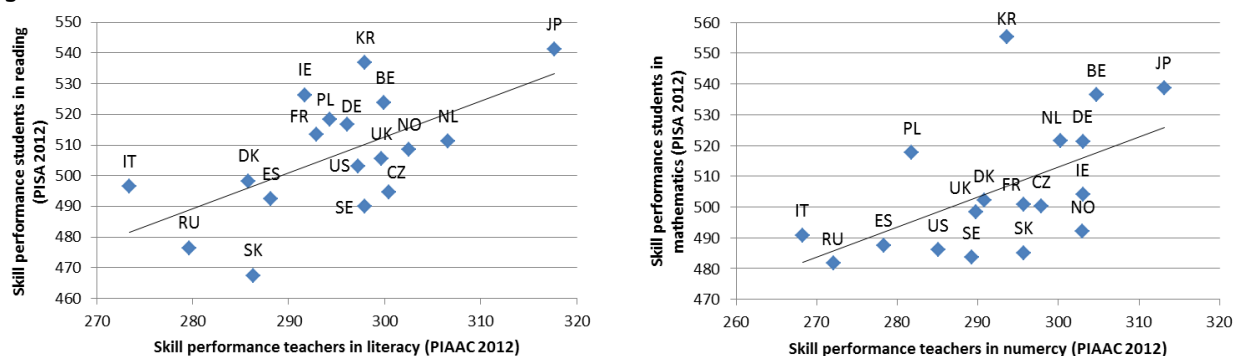
### Alternative lesson III: don't *just* invest in education

In all, we do not believe that just investing more in education will do the job; especially not for the already poorly performing countries. At the same token, however, we also do not suggest that these countries should invest less in education. In fact, when it comes to their education system, we favor neither financial austerity nor financial stimulus. As it turns out, the education system is not just a simple input-output system where, whenever you put more money in, you'll get more quality out. The overall point here is that, what is needed in terms of education policy in Eastern and Southern EU member states is most likely to be vastly different from what is needed in Northern and Western EU member states. There is no such thing as 'one size fits all' education policy. Especially in the former set of member states, putting more money into the education system is probably not enough for increasing both education attainment levels and skill levels.

**The relative underperformance of Southern and Eastern EU member states in education might be much more a systemic problem than an investment problem**

A major concern here is pointed out by the relation between skill performance of teachers and skill performance of students in Figure 11. Many recent studies confirm that high-quality teachers raise student performance; indeed, educational science scholars generally agree that the most important thing a school can do is to provide its students with good teachers (Hanushek, 2011). Using teachers' skills from PIAAC as a proxy of teachers' quality and students' performance from PISA we exploit a multilevel model to investigate how much of the variation in latter indicator can be explained by the former (Meroni et al., 2014). Results show that teachers' skills seem to have positive effects on student achievement and explain part of the variation between OECD countries in students' performance.

**Figure 11. Relation between students' scores in PISA (2012) and teachers' skills in PIAAC (2012)**



Source: Meroni et al., 2014

These results need not imply that the teachers are to blame for their students' relative under-performance because, alternatively, the education system of relatively poor performing countries might be designed in a way



that it is unattractive for skilled teachers. In fact, recent studies show that differences in school systems and institutional characteristics play an important role in explaining cross-country differences in students' performances (Hanushek and Woessman, 2011). The overall point to make here then is that if we are to improve the skills of students early on, we should improve the learning environments in which they are raised.

## 5. Concluding remarks

The received wisdom on education emphasizes the importance of people attaining higher levels of education as a solution to solving both economic and social problems. The policy implication that follows from the received view stresses to make investments in moving people from lower to higher education levels accordingly. This note made some qualifying remarks questioning both the received wisdom on education itself as well as the policy implications that are derived from it. Sure, higher education attainment levels go hand in hand with various economic performance indicators. However, these indicators typically hide the differences that exist among countries; both in terms of job prospects of highly educated people and skill differences among those with the same level of education attained. Taking such differences into account, this brief showed that the policy implications that follow from the received wisdom on education are questionable.

In particular, we made three qualifying remarks on the received wisdom. First, we showed that, beyond formal education levels, skills are at least as important in relation to generating positive social outcomes. What is more, keeping education attainment levels fixed, we observe enormous differences in people's skill levels across EU member states. In other words, education attainment levels only tell us part of the story about the importance of education; and perhaps not the most central part therein. Second, we showed that, for many countries, being a university graduate by no means offers a guarantee to finding a job. That is to say, for some countries, the prospects of finding a job are low even if you attained higher education. Third, although investments in education go hand in hand with higher education attainment levels, the relation between investments in education and skill performance levels are far less clear cut. In fact, a positive and significant correlation between education investments and skill performance seems to be entirely absent. Following these qualifying remarks and backed up by further evidence, we formulated three key policy messages:

Education is far too complex to allow  
for 'one-size-fits-all' policies

1. Improve education attainment levels but make sure that skills are being improved accordingly.
2. Improve skills early on whereas a) skill performance at an early stage in life correspond well with skill performance at a later stage in life and b) skill performance at a later stage in life correspond well with employment status.
3. Given the poor correlation between education investments and skill performance, for many EU member states education investments alone are not enough to improve economic performance.

As education is a complex dynamic  
system, it can only be steered taking  
into account a broad and ever  
evolving evidence base

Overall, what this brief stressed is that, beyond formal education attainment levels, what policymakers should take into account are the skills that people have obtained through education. Here, we are not suggesting that the range of skills that have been actually measured and how they are measured is the best way to monitor skill

performance now and in the future. In fact, the use of student assessments in measuring their skills has been seriously questioned (cf. Andrews et al., 2014). No single indicator offers the “new holy grail” on measuring and monitoring education. Instead, policymakers should take into account and weigh a range of different indicators if one is to make a proper judgment about where education is heading to and what to do about it in order to improve it.

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## Annex

**Table A1. Description of variables**

Variable	Definition	Source	Obs	Mean	Std. Dev.	Min	Max
Tertiary education attainment	% of the population 30-34 year old with tertiary education	Eurostat	33	37.70	10.08	19.50	52.60
Research excellence in S&T	Composite indicator measuring research excellence in science & technology at the country level	Hardeman et al. (2013)	28	39.83	22.07	13.20	87.90
Global innovation index	Composite indicator measuring innovative performance at the country level	Cornell University et al. (2014)	33	49.61	8.11	36.90	64.80
Global competitiveness index	Composite indicator measuring the competitiveness of countries	World Economic Forum (2014)	33	4.76	0.50	4.04	5.70
Human development index	Composite indicator measuring human development of countries	UNDP (2014)	33	0.86	0.05	0.73	0.94
Income	Income per capita (natural logarithm)	UNDP (2014)	33	10.29	0.39	9.37	11.07
Employment differential of lower educated	Difference in employment rate between people having attained at most lower secondary education (ISCED 0-2) and people having attained at least upper secondary or post-secondary, non-tertiary education (ISCED 3-4)	Eurostat	28	-27.62	10.93	-50.40	-8.00
Employment differential of higher educated	Difference in employment rate between people having attained higher education (ISCED 5+) and people having attained at least upper secondary or post-secondary, non-tertiary education (ISCED 3-4)	Eurostat	28	15.07	4.51	7.00	24.60
Education expenditures per GDP	Total public expenditures on education as a % of GDP for all levels of education combined	Eurostat	27	5.16	1.10	3.32	8.29
Employability of recent graduates	Employment of rate of recent graduates in higher education	Eurostat	31	73.79	12.44	42.90	91.90
Students' average skill performance in reading	Students' average skill performance in reading as measured by PISA 2012	OECD	26	489.65	23.46	436.00	524.00
Students' average skill performance in mathematics (2012)	Students' average skill performance in mathematics as measured by PISA 2012	OECD	26	489.65	24.16	439.00	523.00
Students' average skill performance in science	Students' average skill performance in science as measured by PISA 2012	OECD	26	497.38	27.72	438.00	545.00
Average student-teacher ratio	Average number of students per teacher over the life course of a student attaining ISCED 1 (2002-2006), ISCED 2 (2007-2009), and ISCED 3 (2010-2011)	Eurostat	22	13.75	2.59	9.29	18.18
Accumulated per student investments in education	Accumulated annual expenditure on public and private educational institutions per pupil/student in PPS (ISCED 1 for 2002-2006 and ISCED 2-4 for 2007-2011)	Eurostat	19	53855.65	19698.74	18012.50	78666.30
Low achievers in literacy	Share of the working age population with low skills in PIAAC (Level 1 and lower for literacy)	OECD	17	0.48	0.09	0.35	0.67
High achievers in literacy	Share of the working age population with medium and high skills in PIAAC (Level 3 and higher for literacy)	OECD	17	0.50	0.09	0.32	0.65
Employment status employed	% of respondents being employed	OECD	17	0.67	0.07	0.55	0.78
Employment status unemployed	% of the respondents being unemployed	OECD	17	0.06	0.03	0.02	0.14
Students' average skill performance in mathematics (2006)	Students' average skill performance in mathematics as measured by PISA 2006	OECD	22	504.89	22.42	461.69	548.36

Adults' skill performance in numeracy	Adults' average skill performance in numeracy as measured by PIAAC 2012	OECD	22	271.42	11.21	249.42	285.40
Teachers' skill performance in literacy	Teachers' average skill performance in literacy as measured by PIAAC 2012	Meroni et al. (2014)	18	294.90	10.09	273.43	317.68
Teachers' skill performance in numeracy	Teachers' average skill performance in numeracy as measured by PIAAC 2012	Meroni et al. (2014)	18	292.53	11.93	268.24	313.16

**Table A2. Correlations (correlations in bold are statistically significant at  $\alpha < 0.05$ )**

Variable	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.	19.	20.	21.	22.	23.
1. Tertiary education attainment	1.00																						
2. Research excellence in S&T index	<b>0.39</b>	1.00																					
3. Global innovation index	<b>0.62</b>	<b>0.85</b>	1.00																				
4. Global competitiveness index	<b>0.55</b>	<b>0.85</b>	<b>0.90</b>	1.00																			
5. Human development index	<b>0.64</b>	<b>0.80</b>	<b>0.84</b>	<b>0.74</b>	1.00																		
6. Income	<b>0.60</b>	<b>0.72</b>	<b>0.85</b>	<b>0.82</b>	<b>0.93</b>	1.00																	
7. Employment differential of lower educated	0.03	0.18	0.16	0.14	0.23	0.26	1.00																
8. Employment differential of higher educated	0.10	<b>-0.64</b>	<b>-0.60</b>	<b>-0.54</b>	<b>-0.47</b>	<b>-0.49</b>	0.11	1.00															
9. Education expenditures per GDP	<b>0.39</b>	<b>0.57</b>	<b>0.42</b>	<b>0.42</b>	0.36	0.35	-0.07	<b>-0.39</b>	1.00														
10. Employability of recent graduates	0.35	<b>0.42</b>	<b>0.70</b>	<b>0.66</b>	<b>0.57</b>	<b>0.63</b>	-0.22	<b>-0.45</b>	<b>0.41</b>	1.00													
11. Students' average skill performance in reading	<b>0.40</b>	<b>0.51</b>	<b>0.60</b>	<b>0.60</b>	<b>0.65</b>	<b>0.52</b>	0.04	-0.16	0.29	0.34	1.00												
12. Students' average skill performance in mathematics (2012)	0.24	<b>0.44</b>	<b>0.56</b>	<b>0.59</b>	<b>0.59</b>	<b>0.51</b>	-0.14	-0.29	0.27	<b>0.54</b>	<b>0.90</b>	1.00											
13. Students' average skill performance in science	0.32	<b>0.40</b>	<b>0.56</b>	<b>0.54</b>	<b>0.55</b>	<b>0.40</b>	-0.13	-0.17	0.24	<b>0.42</b>	<b>0.93</b>	<b>0.94</b>	1.00										
14. Average student-teacher ratio	0.00	0.08	0.06	0.14	-0.08	-0.15	-0.22	-0.18	-0.31	0.05	-0.11	-0.06	-0.04	1.00									
15. Accumulated per student investments in education	0.25	<b>0.71</b>	<b>0.69</b>	<b>0.58</b>	<b>0.79</b>	<b>0.84</b>	<b>0.72</b>	<b>-0.51</b>	<b>0.58</b>	0.38	0.31	0.23	0.14	-0.26	1.00								
16. Low achievers in literacy	-0.26	-0.41	-0.40	-0.46	-0.13	-0.19	0.38	0.39	-0.34	<b>-0.70</b>	-0.16	-0.31	-0.21	-0.17	-0.04	1.00							
17. High achievers in literacy	0.18	0.46	<b>0.49</b>	<b>0.53</b>	0.20	0.20	-0.48	-0.45	0.24	<b>0.68</b>	0.35	<b>0.50</b>	0.44	0.25	-0.12	<b>-0.92</b>	1.00						

Variable	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.	19.	20.	21.	22.	23.
18. Employment status employed	0.16	<b>0.76</b>	<b>0.74</b>	<b>0.80</b>	<b>0.67</b>	<b>0.76</b>	0.25	<b>-0.65</b>	<b>0.51</b>	<b>0.74</b>	0.21	0.31	0.26	-0.05	0.68	<b>-0.53</b>	<b>0.52</b>	1.00					
19. Employment status unemployed	0.02	<b>-0.58</b>	<b>-0.51</b>	<b>-0.64</b>	-0.45	<b>-0.60</b>	0.07	<b>0.63</b>	<b>-0.47</b>	<b>-0.75</b>	-0.15	-0.30	-0.15	-0.03	-0.46	<b>0.68</b>	<b>-0.59</b>	<b>-0.82</b>	1.00				
20. Students' average skill performance in mathematics (2006)	0.32	0.48	<b>0.50</b>	<b>0.54</b>	0.11	0.12	-0.16	-0.24	0.40	0.48	<b>0.52</b>	<b>0.69</b>	<b>0.58</b>	0.16	0.19	<b>-0.86</b>	<b>0.82</b>	<b>0.55</b>	<b>-0.61</b>	1.00			
21. Adults' skill performance in numeracy	-0.05	0.27	0.20	0.32	0.00	0.14	-0.48	<b>-0.51</b>	0.34	<b>0.66</b>	0.09	<b>0.52</b>	0.22	0.02	0.02	<b>-0.87</b>	<b>0.82</b>	<b>0.54</b>	<b>-0.67</b>	<b>0.74</b>	1.00		
22. Teachers' skill performance in literacy	0.48	0.36	0.51	<b>0.59</b>	0.43	0.32	-0.11	-0.11	0.05	<b>0.80</b>	0.36	<b>0.56</b>	0.48	0.43	0.08	<b>-0.79</b>	<b>0.74</b>	0.41	<b>-0.45</b>	<b>0.63</b>	<b>0.49</b>	1.00	
23. Teachers' skill performance in numeracy	0.34	0.35	0.39	0.50	0.44	0.40	-0.22	-0.20	0.02	<b>0.69</b>	0.31	0.48	0.29	0.48	0.04	<b>-0.69</b>	<b>0.61</b>	0.40	<b>-0.59</b>	<b>0.67</b>	<b>0.56</b>	<b>0.78</b>	1.00





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Abstract

This technical report deals with secondary data analysis on the link between education investment, educational outcomes and socioeconomic indicators/outputs such as Research Excellence in Science & Technology, Global Innovation Index, Global Competitiveness Index, Human Development Index, and more generally, employment rates, educational attainment or per capita income.

In this research (still ongoing) there is a reflection on the fact that while higher education attainment levels go hand in hand with various economic performance indicators, however, these indicators typically hide the differences that exist among countries; both in terms of job prospects of highly educated people and skill differences among those with the same level of education attained. Taking such differences into account, this research seems to show that the policy implications that follow from the received wisdom on education are questionable.

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